DOCUMENT RESUME

ED 389 271 IR 017 475

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TITLE Decreasing Computer Anxiety and Increasing Computer Usage among Early Childhood Education Majors through a Hands-On Approach in a Nonthreatening Environment.
PUB DATE 95
NOTE 62p.; Ed.D. Practicum, Nova Southeastern University.
PUB TYPE Dissertations/Theses - Practicum Papers (043) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *College Students; *Computer Anxiety; Computer Literacy; *Computer Uses in Education; Early Childhood Education; Educational Technology; Higher Education; Knowledge Level; Methods Courses; Practicums; *Student Attitudes; *Training
IDENTIFIERS *Hands on Experience; *Preservice Teachers

ABSTRACT

This practicum was designed to lessen the computer anxiety of early childhood education majors enrolled in General Curriculum or General Methods courses, to assist them in learning more about computer applications, and to increase the amount of time spent using computers. Weekly guidelines were given to the students, and a hands-on approach was used in a laboratory setting. Students were encouraged to explore applications beyond the minimal guidelines with the understanding that their grades would not be affected adversely by their computer experiences. The 10 students were allotted a 2-hour block of time each week in the technology lab and were encouraged to use the facilities during regular lab hours. Each student used the various types of computers available. Analysis revealed that all of those enrolled demonstrated basic knowledge about computers and basic operating skills, with a majority indicating an increase in their knowledge of computer applications. All students showed an increase in computer usage and a majority of participants expressed a higher level of confidence in using computers and a reduced level of anxiety, and all indicated that they would use computers more extensively in the future. Three appendixes present a use checklist, a usage log, and the study questionnaire. (Contains 2 tables and 20 references.) (Author/SLD)

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ED 389 271

Decreasing Computer Anxiety and Increasing Computer Usage Among Early Childhood Education Majors Through a Hands-On Approach in a Nonthreatening Environment

by

Jacquelyn B. Castleman

Cluster 61

A Practicum I Report Presented to the Ed.D. Program in Child and Youth Studies in Partial Fulfillment of the Requirements for the Degree of Doctor of Education

NOVA SOUTHEASTERN UNIVERSITY

1995

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This practicum report was submitted by Jacquelyn B. Castleman under the direction of the adviser listed below. It was submitted to the Ed.D. Program in Child and Youth Studies and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Nova Southeastern University.

Approved:

8-25-95
Date of Final Approval of Report

Mary Ellen Sapp
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ACKNOWLEDGEMENTS

The writer would like to thank the following students for their enthusiastic participation during the implementation of this practicum: Melondy Adams, Linda Berry, Ina Bridges, Selena Dean, Teresa Ervin, Tommilynn Harris, Catherine Hoyt, Connie Nails, Gloria Phillips, and Strei-Sann Sinkler. Their dedication to this effort will always be remembered.

A word of appreciation is extended to Professor Larry Julian, technology lab director, and to Cindy Bowles, technology lab assistant. Professor Julian extended lab hours and made it possible to implement this practicum while Mrs. Bowles spent her time helping students to utilize computers in ways that enabled them to attain goals set by the writer.

Melba Claxton and Johnette Gunter have given invaluable suggestions during this process. I will never forget their willingness to offer support and encouragement.

A special word of thanks goes to James Castleman, my husband, for his belief in me. His support during this effort is appreciated more than words can express.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	v
Chapter	
I INTRODUCTION	1
Description of Community	1
Writer's Work Setting and Role	2
II STUDY OF THE PROBLEM	4
Problem Description	4
Problem Documentation	5
Causative Analysis	5
Relationship of the Problem to the Literature	7
III ANTICIPATED OUTCOMES AND EVALUATION INSTRUMENTS	17
Goals and Expectations	17
Expected Outcomes	17
Measurement of Outcomes	18
IV SOLUTION STRATEGY	22
Discussion and Evaluation of Possible Solutions	22
Description of Selected Solution	29
Report of Action Taken	30
V RESULTS, DISCUSSION, AND RECOMMENDATIONS	37
Results	37
Discussion	42
Recommendations	45
Dissemination	46
REFERENCES	47

Appendices Page

A CHECKLIST OF COMPUTER KNOWLEDGE AND SKILLS..... 49

B LOG OF COMPUTER USE..... 51

C STUDENT QUESTIONNAIRE..... 53

LIST OF TABLES

Table

1 Hours Spent Weekly Using Computers..... 40

2 Changes in Knowledge, Confidence, and Anxiety Levels..... 41

ABSTRACT

Decreasing Computer Anxiety and Increasing Computer Usage Among Early Childhood Education Majors Through a Hands-On Approach in a Nonthreatening Environment. Castleman, Jacquelyn B., 1995: Practicum Report, Nova Southeastern University, Ed.D. Program in Child and Youth Studies. Computerphobia/Computer Anxiety/Technophobia/ Cyberphobia/Technostress

This practicum was designed to lessen the computer anxiety of early childhood education majors enrolled in General Curriculum and/or General Methods courses, to assist them in learning more about computer applications, and to increase the amount of time spent utilizing computers. The writer provided weekly guidelines to the students and a hands-on approach was used in a lab setting. Students were encouraged to explore applications beyond the minimal guidelines with the understanding that their grade would not be affected adversely by their computer experiences.

The 10 students were allotted a 2-hour block of time each week in the technology lab. In addition, they were encouraged to utilize the facilities during regular lab hours. They had access to Apple IIe, IBM compatible, and Macintosh computers. Each student performed operations on all three types of computers.

Analysis of the data revealed that all of those enrolled demonstrated basic knowledge about computers and basic operating skills, with a majority indicating an increase in their knowledge of computer applications. All students showed an increase in computer usage and a majority of those participating expressed a higher confidence level when utilizing computers. A majority of the participants showed a reduced level of anxiety while all participants indicated that they would utilize computers more extensively in the future.

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June 27, 1995 Jacquelyn B Castleman

CHAPTER I

INTRODUCTION

Description of Community

This community is located in the southeast and is the county seat of a county located in the primarily agrarian area of the state. Abandoned buildings in the business area of this small town provide evidence that, during the past several years, the area has experienced a decrease in the number of businesses. Because of this decrease, many residents are forced to commute to other counties for employment.

Like many other small communities without industry and with few local businesses, this district finds itself dealing with the problem of poverty. Bachtel and Boatright (1993) revealed that 24.5% of all residents are living below the poverty level ($ 12,674 in 1989), including 45.9% of all Blacks and 14.8% of all Whites. Equally startling is the fact that 44.4% of female-headed households in the county fall into this category. As further proof of the economic plight, Bachtel and Boatright also indicated that 53.8% of the local school children qualify for free lunch and 8.2% qualify for reduced lunch prices.

The education level in the area varies greatly. Of the residents 25 years and older, 42.6% fail to finish high school (Bachtel & Boatright, 1993). This is high when

compared with the state level of 29% and the national level of 24%. Of the remaining population, 23.5% have attended 9th-12th grades but have received no diploma, while 19.1% have less than a 9th-grade education. To paint an even bleaker picture, Bachtel and Boatright revealed that 54.5% of Blacks are high school dropouts; less than 10% of the Black high school graduates pursue a higher education. Poverty, illiteracy, and near-illiteracy are major problems in the area.

Writer's Work Setting and Role

The writer's work setting is a private, 4-year liberal arts college located in a small, rural community in the southeastern United States. This college is the only 4-year private college in the southern part of the state. The present enrollment is in excess of 2,200, with well over 500 of these students being enrolled in the education program.

The college is affiliated with a major protestant denomination and is the principal employer in the county. It employs 54 faculty members, 101 staff members, and 5 administrators and has an annual payroll of $5.5 million.

The immediate physical setting for the practicum was the education building of the college. Most of the time was spent in the new technology lab which is located in this building.

Besides the writer, this practicum involved early childhood education majors who were enrolled in two courses, General Curriculum for Early Childhood and General Methods for Early Childhood. There were 10 students enrolled.

The writer's role is that of a college professor. In addition to teaching General Curriculum for Early Childhood and General Methods for Early Childhood, the writer supervises student teachers. During the practicum implementation, she supervised 12 student teachers. These student teachers were located in schools within a 50-mile radius of the college. Within the education division, the writer serves as coordinator for the early childhood program and serves on the Professional Program Committee, the committee responsible for setting entrance requirements for the teacher education program. In addition to these duties, the writer has been appointed by the president of the college to serve as chairman of the college's Task Force on Customer Relations.

CHAPTER II

STUDY OF THE PROBLEM

Problem Description

Inadequate usage of and discomfort with computers by preservice teachers was a major problem. Early childhood education majors displayed an aversion to, and even a fear of, using computers or other technology to complete major assignments. This fear restricted their use of computers and heightened their level of discomfort with computers.

Although all education majors were required to take a 2-hour introductory course in data processing which was taught by a business professor, they continued to be reluctant to use computers. Many felt that the course was not relevant to education; primary skills and knowledge gained during the course were lost because of lack of application and practice.

If students were to gain the expertise with computers that is essential for today's teachers, they needed to be comfortable with computers and needed to increase the amount of time they spent utilizing computers. The problem of inadequate usage of and discomfort with computers among preservice early childhood education majors needed to be solved.

Problem Documentation

Several sources provided evidence that students failed to use computers when completing assignments. First of all, student files contained samples of work that were typewritten or handwritten. As unobtrusively as possible, the writer observed students as they worked on major assignments and noticed that, although computers were available for use, most students resisted using them.

In addition, two other sources provided evidence that students did not use computers. Each quarter the writer took informal polls among students in General Curriculum for Early Childhood and General Methods for Early Childhood; these polls revealed that students rarely utilized computers in completing assignments. Clinical observations of student teachers also revealed little or no usage of computers in classroom instruction or management.

Causative Analysis

The problem may have been caused by several factors. These included (a) age and gender, (b) inexperience, (c) lack of knowledge of computers, (d) inaccessibility of computers, and (e) insufficient requirements of computer usage by professors.

All but three of the writer's students were nontraditional female students who entered college after being absent from the world of academia for several years.

In a study by Rosen, Sears, and Weil (1987) it was noted that age and gender do play an important role in one's attitude and feelings toward computers. Older students, male and female, have more anxiety than their younger counterparts; however, the older students' attitudes are as positive as the younger students'. Further, Rosen et al. found that women tend to have more negative attitudes toward computers and that feminine-identity students, whether male or female, have more anxiety and more negative attitudes toward computers than males or masculine-identity students. The students' age, gender, and attitude toward computers definitely affected their desire to use them.

It appeared to the writer that students' lack of experience with and lack of knowledge about computers contributed to their fear of using them. Lambert and Lenthall (1989), in their study of psychology students, concurred with the writer's idea regarding the correlation between experience and fear of computers. However, Marcoulides (1988) contended that computer anxiety is present even among those who have had much exposure to them. Rosen et al. (1987) revealed that they found no relationship between experience (or inexperience) and computer anxiety. Torkzadeh and Angulo (1992) disclosed that fear of the unknown (from a lack of experience) can cause computer anxiety and that organizations which invest in up-front education and training come closer to realizing the

potential of their employees. The writer found that the preservice teachers were representative of both factions: Anxiety was present, to a degree, in both experienced and inexperienced students.

The problem at the writer's work site was exacerbated by several factors. First of all, the college has limited computer facilities available to students. The new technology lab houses several computer stations which are available for education majors, but these are not sufficient to meet the needs of the students. Secondly, a very small percentage of students own or have access to computers except at school; this severely limits their ability to gain experience in using them. Another cause for the students' failure to use computers was that few professors required the use of computers in completing assignments.

The writer believed that human behavior could not be attributed to any one causative factor. Therefore, several specific causes for the inadequate usage of and discomfort with computers by preservice teachers were identified. These included (a) age and gender, (b) lack of knowledge of and experience with computers, (c) inadequate facilities, and (d) insufficient requirements for computer usage by professors.

Relationship of the Problem to the Literature

The problem of computerphobia/computer anxiety is one of major proportions. Throughout American society one can

find those who have actual emotional and/or physical symptoms when faced with utilizing computer technology. These anxious people and their anxiety condition were referred to in various terms in the literature. Gelder (1985) referred to the condition as technophobia, while Gressard and Loyd (1986), Lambert and Lenthall (1989), Leso and Peck (1992), Marcoulides (1988), and Torkzadeh and Angulo (1992) labeled it computer anxiety. Harrington (1988) listed cyberphobia and technostress as terms used by researchers. Computerphobia (Harrington, 1988; Kennedy, 1988; Rosen, Sears, & Weil, 1987; Rosen, Sears, & Weil, 1989; Rosen & Weil, 1990; Weil, Rosen, & Shaw, 1988; Weil, Rosen, & Wugalter, 1990) is by far the most common term by which this condition is known.

Computerphobia is no respecter of age, gender, ethnicity, nor occupation. Several researchers gave insight regarding how pervasive this problem is. Peterson and K-Turkel (1983) revealed that 30% of employees in the business world suffer actual physical symptoms when faced with using computers. Rosen and Weil (1990) estimated that 25% to 55% of all college students and business people suffer from this discomfort. Weil et al. (1988) provided estimates that 25% to 50% of the general population suffer from computerphobia. Weil et al. (1990) cited studies which estimate that the malady affects from 10% to 40% of the population. DeLoughry (1993) said that surveys indicate one

third of 14 million college students are affected with some degree of computerphobia. In a study by Rosen et al. (1989) computerphobic college students who volunteered for their Computerphobia Reduction Program included Hispanics, Whites, Blacks, Asians, males, and females. Truly, it is a problem of gigantic proportions.

The literature revealed a variety of causes for these feelings of anxiety about computers. Other fears may contribute to computer anxiety: fears of looking stupid, losing control over one's worklife, losing one's job, damaging the computer, losing information (Torkzadeh & Angulo, 1990); math anxiety (Gressard & Loyd, 1986; Marcoulides, 1988); and a fear of breaking the computer and of technology in general (Kennedy, 1988). Some of these same fears were expressed by education majors, especially the fears of losing information, of breaking the computer, and of technology in general.

Weil et al. (1990) found that early childhood and adolescent mechanical experiences have an impact on adult experiences with technology. The early childhood mechanical experiences included being introduced to common household appliances, bicycles, automobiles, and forms of entertainment such as video games and stereos. These introductions normally occurred between the ages of 9 and 12 years and were introduced by a parent. Their findings indicated that 75% of those who were uncomfortable using

computers and 79% of the students in the control group were introduced to mechanics by males, while 58% of those suffering from computerphobia were introduced by females, most of whom had negative feelings toward the experiences. The adolescent mechanical experiences occurred between the ages of 15 and 18 years and included automobiles and/or engines, office machinery, entertainment, and household appliances. Most introducers were parents or teachers and most were males. Again, those suffering from computerphobia showed more negative feelings toward these experiences than did the other subjects. Weil et al. related that these experiences indicate the condition known as computerphobia may be established as early as adolescence.

Some sources revealed that gender and/or gender-role identity play important roles in computerphobia. The early childhood participants in this practicum were female, and according to Gelder (1985), women are generally "turned off" by computers, either because of suspicion regarding their hazards to pregnant women or because computers are thought to be a "male thing." Gelder further related that a study by the Educational Testing Service found that, following a required computer class, 60% of the boys involved enjoyed computers and only 5% of the girls ever voluntarily used them. In addition, Weil et al. (1990) and Rosen and Weil (1990) contended that describing oneself as having more feminine than masculine traits (gender-role identity) is a

better indicator of whether or not one will be computerphobic than gender alone. Most of the female students in the education classes appeared to have been brought up in the traditional southern female role; therefore, their gender-role identity definitely was more feminine than masculine and may have accounted for some of their anxiety.

According to several sources (Bilderback, 1992; Rosen et al., 1987; Torkzadeh & Angulo, 1992) one's age has an effect on one's attitude toward computers and, consequently, on one's use of them. Rosen et al. found that older, nontraditional students show more anxiety about computers than younger students. This was true in the writer's workplace; generally, older students tended to show more frustration when working with computers than the traditional students. Rosen et al. and Bilderback contended that part of this anxiety may be due to a lack of experience or to negative experiences with technology. Bilderback further stated that the advances in technology have occurred after many adults were hired, thereby placing more pressure on them to learn how to use computers. As a result, these adults become anxious. This pressure and anxiety were evident, too, among nontraditional students who enrolled in school before computer facilities were made available in the education building and before the increased emphasis on utilizing computers. Evidence existed, therefore, which

indicated that age did affect one's attitude toward and use of computers.

The literature revealed three additional factors which impact one's ability to deal with computers. Torkzadeh and Angulo (1992) found that one's cognitive style affects one's ability to use computers. There are two distinct types of thinkers: The analytics are those who are very detail-oriented and the heuristics are those people who see the entire picture. Torkzadeh and Angulo asserted that the analytics probably feel less anxiety when working with computers, since computers require users to pay attention to details.

In addition to cognitive style, Harrington (1988) and Leso and Peck (1992) declared that anxiety state/traits have a definite role in computer anxiety. Leso and Peck distinguished between the two terms. State anxiety is a temporary, situational state that is caused by one's reaction to a perceived stressful event. On the other hand, trait anxiety is a more permanent condition, a personality characteristic that causes one to exhibit general anxiety and to have even more elevated stress when these perceived stressful situations are anticipated or encountered. Harrington found that those who are affected by computer anxiety as a situational, temporary state show much higher levels of anxiety when using computers than nonanxious users. Leso and Peck stated that this anxiety is more a

result of prior experiences and can be modified by successful computer encounters. They contended that skill acquisition, however, is directly related to the degree of anxiety one feels when using computers rather than to previous experience.

The third factor that affects one's ability to deal with computers is one's personality style/locus of control. In their study of the etiology of computerphobia, Weil et al. (1990) related that computerphobics differ from other subjects in two personality styles -- their ability to persist at a task and their problem solving style. The subjects who were not computer anxious would pursue a task independently until they reached a solution. Those who were uncomfortable with computers would not pursue the task but would ask for outside help. In contrast, the computerphobics would not pursue the task and were too afraid and/or frustrated to ask for assistance. According to Torkzadeh and Angulo (1990), this anxiety felt by individuals may relate to their locus of control. Those who have internal locus of control believe that they determine how events affect them; therefore, they feel more comfortable with computers and show more confidence when using them. Conversely, those who believe their success depends on outside influences -- fate, chance, luck, others -- have more computer anxiety. The writer observed students who exhibited strong belief in themselves persevere

in the face of difficulty; those less self-assured tended to either look to someone for help or, in frustration, want to turn the machine off and leave.

In addition to cognitive style, anxiety state/traits, and personality style/locus of control, lack of knowledge about computers (Torkzadeh & Angulo, 1992) and lack of hands-on computer experiences (Lambert & Lenthall, 1989; Marcoulides, 1988) directly affect a person's level of comfort with computers. Many computer users feel that they are already too far behind technology to catch up, that they should have mastered the computer earlier. This feeling, according to Torkzadeh and Angulo, relates directly to operational problems such as the inability to type and these relate to one's lack of knowledge about computers. The writer witnessed colleagues and students, especially those in their late 50s and early 60s, trying to deal with this same lack of knowledge. Some who type had little experience dealing with computers and declared that they did not intend to; others who were trying to learn how to use them were facing tremendous challenges because of their lack of operational skills such as typing. This lack of skills and knowledge put great stress on these people as they tried to learn about the operation of the computer.

Not only does the lack of knowledge affect one's comfort level with computers, a lack of hands-on experiences also has an effect on the ease with which one deals with

computers (Lambert & Lenthall, 1989). Marcoulides (1988) revealed that there is some correlation between computer experience and computer anxiety. Although the correlation is not as high as one would expect, one's computer experience does play a role in the degree of computer anxiety one feels.

In addition to all of these causes for computer anxiety, the literature revealed the belief that one's attitude toward computers is extremely important as a determinant of future computer use. Woodrow (1991) stated that it is important to have reliable measures of attitude so that negativity among preservice teachers can be dealt with as soon as it is evident. This writer concurred with Woodrow; hence, this study of computer anxious preservice teachers. Rosen et al. (1989) revealed that the more computer anxious one is, the less positive his attitude toward computers. Gressard and Loyd (1986) also reported a negative correlation between attitude toward computers and computer anxiety: the higher the computer confidence and liking, the lower the level of anxiety.

The literature from psychology, business, education, and social psychology provided impressive evidence that computer anxiety is a real phenomenon, one which affects all segments of American society. Many causes for this ailment were purported: (a) the relationship of other fears to computer anxiety; (b) the influence of early mechanical

experiences; (c) the role of gender/gender-role identity; (d) the effect of one's age on attitude toward and use of computers; (e) the impact of cognitive style, anxiety state/traits, and personality style/locus of control on one's ability to deal with computers; (f) the effect of lack of knowledge and lack of experience on one's level of computer comfort; and (g) the role that one's attitude plays in computer anxiety. The insight gained by the writer in this literature review was invaluable as the problem of computerphobia/computer anxiety among preservice early childhood education majors was addressed.

CHAPTER III

ANTICIPATED OUTCOMES AND EVALUATION INSTRUMENTS

The following goals and outcomes were projected for this practicum.

Goals

The writer had three major goals for the practicum. They were

1. Students in General Curriculum and General Methods will gain more knowledge about computers.
2. Students will become more comfortable with using computers.
3. Students will show an increase in the usage of computers for completing assignments.

Expected Outcomes

There were four expected outcomes projected for this practicum. These outcomes were

1. All of those enrolled will demonstrate basic knowledge about computers (i.e., names of components) and basic operating skills (i.e., turning on, booting programs, utilizing menu, retrieving and saving files, etc.).

2. A majority of those enrolled will demonstrate their skills by playing computer games, by using software designed for children in grades P-5, by using classroom management software, and by using word processing.

3. A majority of those enrolled will demonstrate a higher level of comfort and confidence with computers.

4. All students will prepare at least two formal written assignments on the computer.

Measurement of Outcomes

For outcome 1, the evaluation tools used were teacher observations of student behaviors and a checklist of basic knowledge and skills (see Appendix A). When the students were working in the technology lab, the writer observed their attitudes, actions, and accomplishments and wrote anecdotal records regarding these. These anecdotal records provided the writer with valuable insight regarding students' progress utilizing computers and their attitudes toward them. Whenever the students indicated they were ready, the writer conducted individual conferences with them and had them demonstrate their basic knowledge about computers (i.e., naming component parts) and had them demonstrate their basic skills (i.e., turning on, booting programs, utilizing menu, retrieving and saving files, etc.). The checklist of basic knowledge and skills was completed during this conference.

These particular skills were very basic to the

participants' successful use of the computer. For that reason, the standard of achievement acceptable for indicating success was that a majority of the students named the component parts and a majority of the students demonstrated basic operational skills.

For outcome 2, evaluation tools used included teacher observations and a portfolio of student work. The writer continued to observe students as they worked in the technology lab. Notes were taken regarding the games students played, the children's software utilized, the classroom management applications employed, and the documents produced using word processing. In addition, she continued to monitor students as they worked and made notes concerning their behavior. When students encountered problems, the writer or the lab assistant was available to assist them.

Each week students were required to turn in specific computer-generated items for their portfolios. The standard of achievement that was acceptable for demonstrating success was that a majority of the students accomplished the following by the end of the practicum:

1. Students had to log in at least two hours of computer time each week. These logs were kept in the students' files. Time entries were initialed by the writer or one of the lab assistants (see Appendix B).

2. Students had to complete at least two written applications using classroom management software.

3. Each week, from the third week forward, students had to utilize at least one piece of software designed for use by children in grades P-5. Students were required to place brief descriptions and evaluations of the software in their portfolios.

4. Students had to complete at least five documents of their choice utilizing the word processing application.

For outcome 3, evaluation tools used included teacher observation, individual conferences, and a charting of logged-in time of actual computer use. During teacher observations anecdotal notes about behaviors observed were made and were placed in the practicum journal. These notes were combined with all previous notes, thereby accumulating a type of diary on each person. During individual conferences, the writer conferred with each student regarding her level of comfort and confidence with computers. Pertinent comments were placed in the practicum journal. At the conclusion of the practicum, each student turned in the total number of hours she spent on the computer; these were charted along with the amount of time each student spent using computers prior to the practicum experience.

Two standards of achievement were acceptable for

demonstrating success. First of all, a majority of the students enrolled had to show an increase in the amount of time spent using computers. Secondly, all students had to write a narrative comparing their level of comfort and confidence with computers with the level they possessed at the beginning of the practicum. A positive statement was expected from most participants.

For outcome 4, the evaluation tools that were used included teacher observations and reading the assignments. As before, during teacher observations any behaviors that needed to be recorded were added to the existing anecdotal records. The writer checked the students' portfolios to be sure that the two written assignments were completed; she read the assignments. There were no grades given on these assignments.

The standard of achievement that was acceptable for indicating success was that all students actually completed two written assignments on the computer. No other evaluation of the written assignments was made.

CHAPTER IV

SOLUTION STRATEGY

The problem that existed in the writer's workplace was that preservice teachers displayed an aversion to, and some fear of, computers and were not utilizing them to complete assignments. Although they were required to take an introductory business course in data processing, most of these students failed to see the relevance to education and promptly forgot the skills and knowledge gained during the introductory course, resulting in the inadequate usage of computers and continued discomfort with using them.

Discussion and Evaluation of Possible Solutions

The literature revealed several possible solutions for lessening computerphobia or computer anxiety. Some of these were (a) increasing hands-on computer time, (b) providing strong role models for girls, (c) encouraging introducers to be positive, (d) refraining from evaluating early experiences, (e) training effectively, (f) providing a nonthreatening environment, (g) modifying the way one considers computers, and (h) using humor.

Lambert and Lenthall (1989) suggested that increasing computer experience through coursework can lessen computer anxiety. According to them, it is unnecessary to use special programs to reduce anxiety prior to taking a course

that includes computer use requirements. They further stated that all, except the true computerphobics, can experience a reduction in anxiety levels during the time the course is taken; the increased experience and familiarity with computers gained during coursework is likely to lessen the degree of anxiety felt.

Studies have found that having positive role models, being introduced to the computer by one who is positive toward and comfortable with computers, and experiencing computers in a nonevaluative setting are important in lessening anxiety. Gelder (1985) suggested that girls be introduced to computers by strong female role models and that they see many females having a good time using technology. Seeing females experiencing success with computers can be a powerful way to affect anxious females' attitudes and can encourage them to learn technology.

In addition to having positive role models, Weil et al. (1990) proposed that computer anxiety can be lessened by ensuring that early technology experiences are introduced by those who are comfortable with computers and feel positive toward technology in general. The computerphobics in their study were introduced to technology by their mothers who were remembered as being uncomfortable with the experience. More important than these initial introductions, however, were the later computer experiences that occurred in classrooms or in the workplace. Weil et al. and Gressard

and Loyd (1986) found that placing computerphobics and the computer anxious in evaluative situations increases their level of anxiety and makes them apprehensive about future experiences with computers. Anxiety can be lessened by allowing computer anxious individuals to interact with computers in a nonevaluative, nonacademic environment; therefore, grading should be avoided and plenty of "free play" should be allowed.

Effective training is a useful way to combat computer anxiety. Two studies (Gressard & Loyd, 1985; Lambert & Lenthall, 1989) reported that nonthreatening computer applications such as games, tutorials, and orientation programs can lessen preexisting computer anxiety. They contended that these are ideal for training computerphobics since they are fun and usually easy to use.

To increase training effectiveness, Leso and Peck (1992) suggested that teacher training should begin with simple applications. Students should be introduced first to tools software such as word processing, spreadsheet, database management, and utility programs (e.g., game programs, test banks, puzzle generators, and gradebook programs). By using these applications, users can complete small tasks and can get feedback on each step; this gives them a much-needed sense of accomplishment. According to Leso and Peck, programming is not appropriate for beginning computer users because of the delay in feedback and the

complexity of the task.

Bruder (1990) contended that effective training should be a joint effort between colleges of education and school districts that hire their graduates. Schools of education have difficulty covering all of the concepts and skills needed by beginning teachers; therefore, school districts could ease the burden by agreeing to continue technology training for these students during practicums, internships, and early years of teaching. This cooperative, continuing education would help ease any fears and would keep teachers current in their knowledge of technology.

According to Barrow and Karris (1985) and Harrington (1988) the setting in which one received computer training and the type of training received affect one's anxiety level. Barrow and Karris suggested that a workshop setting can be used to reduce anxiety. The first day is spent in a comfortable lounge area where participants share their negative and positive experiences with computers. Participants then think of computer tasks they will be performing on the second day and compile them in a hierarchical list from least to most stressful. After completing the list, they practice progressive relaxation techniques and then move into two groups for desensitization, using the stressors on the list. On the second day, the participants use relaxation techniques and imagery before beginning computer tasks. Then they are

taught simple skills such as logging on and off on two different systems. By the end of the day, they are able to complete an exercise independently. The third day of the workshop introduces a new system and adds working with files. Attention to the affective concerns of participants may lead to a reduction in computer anxiety.

Harrington (1988) recommended that one be given a choice between two types of training, lecture/demonstration and hands-on. During the lecture/demonstration training, participants have interaction with the trainer and are able to get clarification on points of confusion. In the hands-on approach, they deal directly with the computer through an interactive tutorial format. In addition to having a choice in the type of training they receive, trainees should be given sufficient time to become comfortable with the computer before employers expect substantial production from them. Careful consideration should be given to both setting and type of training when dealing with those who suffer from computer anxiety.

Bilderback (1992) contended that a very personalized touch is necessary when teaching adults who are not computer literate. She found that using something that is familiar to the learner, such as balancing a checkbook, is important. This makes learning more meaningful and ensures speedier success. Another way to increase the comfort level of adult students is by seeing that they are physically and mentally

comfortable with computers. Bilderback found that having informal dialogue with students about possible problems and what could be done to solve them helps allay some of their fears. Sharing one's own horror stories about early computer experiences and finding humor in them also lets students know that she can empathize with them. A mutually respective personal relationship such as the one described would help decrease student anxiety levels.

Additional ways to decrease computer anxiety were found in the literature. Marcoulides (1988) gave suggestions similar to Bilderback's (1992). Those who instruct computer-anxious students play an important role in reducing their anxiety by establishing environments that are as relaxed as possible. Offering supportive tutoring in this nonthreatening environment can be very successful. Another idea was given by Kennedy (1988). He suggested having students consider computers as just another piece of technology. When they compare how little harm the computer can do with the harm that is caused by inventions like automobiles, chances are they will overcome some of their fears and will approach computers with more confidence.

Weil et al. (1988), Rosen et al. (1989), Rosen and Weil (1990), and Torkzadeh and Angulo (1992) offered additional ideas on the training and treatment of computerphobic and computer anxious people. Torkzadeh and Angulo stated that people who are involved in the training process need to have

input in the way it is accomplished. In addition, these computer anxious individuals need to have training in how to identify their thoughts, attitudes, and behavior toward computers and retrain the negative into new, positive ways of thinking and behaving.

Weil, et al. (1988), Rosen et al. (1989), and Rosen and Weil (1990) reported on The Model Computerphobia Reduction Program at California State University, Dominguez Hills, CA. This innovative 5-hour program recommends different treatments for those who are computer anxious and those who have symptoms of suffering from computerphobia. Some people display minor discomfort and a few negative thoughts about computers. These people can be helped through a support group which answers questions they may have and helps them overcome their anxiety toward computers. Others have more pronounced anxieties cognitively but exhibit a calmness to those around them. The treatment for them involves having them identify their negative thoughts and replacing them with positive declarations. The third category is for those who are limited severely by their fear of computers: the computerphobics. These people identify, in a hierarchical list, their fears and anxieties about computers. Through a process of relaxation and desensitization, they gain enough confidence to want to interact with the computer. Treating the computer anxious students according to the intensity of their anxiety has been very successful: Rosen and Weil

reported that all treatment groups showed dramatic changes and exited the program as noncomputerphobics.

Description and Justification for Solution Selected

The writer utilized a combination of the solutions found in the literature to reduce computer anxiety among early childhood education majors. Just as Marcoulides (1988) and Bilderback (1992) suggested, the students were introduced to computers in a nonthreatening, nonevaluative environment and were given much individualized attention. This enabled students to feel more comfortable and confident with computers. Encouragement, warmth, and humor were the essential characteristics of the classroom atmosphere.

In order to meet the needs of all students, a variety of instructional techniques and computer applications were used. Students were encouraged to view learning about computers as analogous to learning to operate other technology such as automobiles (Kennedy, 1988), microwaves, automatic teller machines, and library search devices. The instructional techniques included a combination of lecture/demonstration and hands-on activities. Students were given step-by-step instruction on performing basic computer operations and received immediate feedback from the writer or the lab assistant.

As suggested in the literature (Gressard, 1986; Lambert & Lenthall, 1989), the first hands-on student experiences were with nonthreatening computer applications such as

games, tutorials, and orientation programs. After students were comfortable with these, the training was expanded as suggested by Leso and Peck (1992) to include teacher utility programs and word processing. This step-by-step process enabled students to progress slowly, yet advance their skills with each new application.

Throughout the practicum implementation, the writer served as a strong role model for the students. She was involved in computer activities with them and was enthusiastically supportive of their efforts. When situations got tense and students were discouraged or upset, she took a suggestion from Bilderback (1992) and interjected some humor; this kept students from taking themselves too seriously and helped them enjoy the experience.

Report of Action Taken

The practicum implementation began when the writer met with the Education Division chairperson and discussed the practicum and its purposes. The division chairperson gave her approval and support, including permission to reserve the technology lab for two hours per week during the implementation phase. The writer then made arrangements for lab times and a lab assistant with the director of the technology lab.

During the next week, the writer checked with the registrar of the college to determine how many students were enrolled in her two classes, General Curriculum for Early

Childhood and General Methods for Early Childhood. She determined that the first night of class would be the most desirable date and time for the administration of the questionnaire (see Appendix C).

During the same week the writer reviewed the college's computer software to determine exactly what would be used during the implementation of the practicum. It was discovered that the college did not have enough software available for all three types of computers (Apple IIe, IBM compatible, and Macintosh) to be utilized by the entire class. The writer immediately went to the Georgia Learning Resources System (GLRS) and checked out software for the Apple IIe. GLRS was also willing to duplicate public domain software for the IBM compatible; therefore, the problem of insufficient software was solved.

As part of the first class session, the students completed the questionnaire and were informed about the writer's plans for the practicum implementation. They were given copies of the forms they were responsible for keeping during the practicum and were given a manila folder to use as a portfolio. The questionnaires were collected and the writer compiled information which enabled her to understand the students' positions regarding computers. During the latter part of the week, she prepared a notebook containing a page for each student. This notebook was used to keep her memos concerning the students' actions during the practicum

implementation.

The next step in implementation was familiarizing the students with the technology lab and its contents. One of the lab assistants explained the various types of equipment housed in the lab and the purpose for each. She also explained the lab rules. The writer then distributed prepared handouts indicating the basic components of the computer (e.g., screen, processor unit, keyboard, and printer), the components involved in the four basic operations in the information processing cycle (i.e., input, processing, output, and storage), and a list of terms necessary for fundamental understanding of the computer. When this was completed, the writer had students refer to their handout as she pointed out each part of the computer and explained its function in the information processing cycle. Each of the students indicated on her computer where these components were located. At this point, the students practiced turning the machine one and off and practiced reading the menu. From this point forward in the implementation, the students spent the entire 2-hour time allotment in the lab at the computers.

The first tasks given to the students to complete were very basic in nature. They learned how to boot programs, use the mouse, utilize the menu, and retrieve and save files. As they felt confident about their knowledge of the computer and its operations and of their ability to perform

the aforementioned skills, they indicated their readiness to the writer. In this anxiety-free environment, the writer utilized the checklist for evaluation.

After becoming familiar with the computer, students were involved in utilizing them in nonthreatening, nonevaluative ways. The writer allowed them to choose a partner and they played a variety of games designed for adults and children. Allowing the computer-anxious students to choose partners apparently gave them more confidence; therefore, they were allowed the choice of working in pairs throughout the implementation.

Once the students were comfortable using the computers to play games, they were then instructed to choose at least one piece of software designed for children in grades P-5. They utilized the software and then wrote a brief description and evaluation of it and placed it in the portfolios. This assignment was completed each week for six weeks.

Following their initial experiences with the computer, the participants were introduced to teacher utility and classroom management software. An entire lab period was devoted to the exploration of the different programs available. Students were involved in designing certificates, crossword puzzles, calendars, bingo games, exams, worksheets, and coloring sheets, plus other items used by teachers in managing instruction and the classroom.

The students placed at least two of these written applications in their portfolios.

By this time, students were ready to move into the word processing application. The lab assistant and the writer assisted the students with the word processing program installed on their computers. The students established their own file and practiced utilizing the word processing feature. This continued for three lab sessions and the students completed five documents that were placed in their portfolios.

The remaining lab time was spent writing two class assignments using word processing. One of the assignments was a narrative comparing their current levels of comfort and confidence using computers with the levels they felt at the beginning of the practicum experience. The other assignment was one of their choice. Some students chose to write journal article summaries, some chose to write their research paper, and some chose to type their 5-day unit of lesson plans. Students who chose to use word processing to complete the more demanding assignments spent many extra hours in the lab. When these assignments and the weekly assignments were placed in their portfolios, the hands-on phase of the practicum implementation was complete.

During the last week of implementation, in an effort to show the students the importance of acquiring computer skills and knowledge, the writer took them on a field trip

to an elementary school in a nearby town. The media specialist at the school is known throughout this area for her expertise with and knowledge of technology and for the equipment she has been able to acquire for her school. She explained to the students how, through networking, the classrooms have access to numerous computer applications. She further explained how she could determine the computers that were on-line at any given time. During her presentation she stressed how crucial it is for new teachers to be computer competent when they enter the classroom.

The writer spent the remainder of the final week looking at students' portfolios and collecting data to see (a) how much time the students spent using the computers, (b) how many mastered the basic knowledge and skills component, (c) how many pieces and what kind of software they evaluated, (d) what kind and how many classroom management tasks were completed, e) what kind and how many word processing tasks were completed, and (f) the comparisons of levels of confidence and comfort felt by the students before and after the practicum implementation.

One event took place that the writer could not anticipate during the proposal stage. At the college level, class membership changes every quarter. The particular group of students enrolled in General Curriculum and General Methods during the implementation did not show the high levels of anxiety that had been present in previous classes;

however, most did indicate some symptoms of anxiety and two showed enough symptoms to be considered computerphobic. As a result, the writer made the decision to modify the title of the practicum; the focus remained the same.

The writer had planned to introduce spreadsheet and database management during the implementation. As the project proceeded, however, it was evident that time constraints would not allow the inclusion of these applications. The writer decided to delete these plans.

CHAPTER V

RESULTS, DISCUSSION, AND RECOMMENDATIONS

The problem that existed in the writer's college classes was that early childhood education majors utilized computers infrequently and exhibited discomfort with computers. These preservice teachers displayed an aversion to, and some even displayed a fear of, using computers to complete major assignments. This fear severely restricted their use of computers and heightened their level of anxiety when they did employ them.

In order to alleviate this anxiety and to increase the students' computer usage, the writer implemented a highly-individualized, step-by-step program of computer usage which was completed in a nonthreatening, nonevaluative environment. This program included (a) a combination lecture/demonstration of computer components and functions; (b) hands-on experiences using the basic skills necessary for successful computing (i.e., booting programs, utilizing the menu, and retrieving/saving files); and (c) hands-on experiences with games and tutorials, with software for children in grades P-5, with teacher utility and classroom management software, and with word processing.

Results

The following outcomes were projected for this

practicum.

Outcome 1: A majority of those enrolled will demonstrate basic knowledge about computers (i.e., names of components) and basic operating skills (i.e., turning on, booting programs, utilizing menu, retrieving and saving files, etc.). The standard of achievement that would be acceptable for demonstrating success would be that a majority of the students named the component parts and demonstrated the basic operating skills.

This outcome was met.

Each student was able to demonstrate basic knowledge about computers and basic operating skills. The writer used the checklist to document student performance.

Outcome 2: A majority of those enrolled will demonstrate their skills by playing computer games, by using software designed for children in grades P-5, by using classroom management software, and by using word processing. The standard of achievement that would be acceptable for demonstrating success would be that a majority of the students would develop a portfolio containing (a) report(s) on one or more games played, (b) six descriptions and evaluations of children's software, (c) two written applications for classroom management software, and (d) five documents of their choice completed with the word processing application.

This outcome was met.

To document this, the writer collected and checked each student's portfolio; most of the portfolios contained more than the required number of documents.

Outcome 3: A majority of those enrolled will demonstrate a higher level of comfort and confidence with computers. There were two standards of achievement that would be acceptable for demonstrating success. First of all, a majority of the students enrolled would have to show an increase in the amount of time spent using computers. Secondly, a majority of the students would indicate an increase in their level of confidence with computers and would indicate a decrease in their level of anxiety.

This outcome was met.

Table 1 displays the time students spent using computers prior to the practicum implementation and during the implementation. Table 2 depicts the students' self-ratings on changes in knowledge level, confidence level, and anxiety level as a result of the practicum implementation.

Outcome 4: All students will prepare at least two formal written assignments on the computer. The standard of achievement that would be acceptable for indicating success was that all students would complete two written assignments on the computer.

This outcome was met.

The writer checked student portfolios to verify that they had completed the two written assignments.

Table 1

Hours Spent Weekly Using Computers

N=10

Student	Prior to Implementation	During Implementation
1	20	30
2	0	8
3	1	5
4	15	20
5	0	4
6	0	4
7	4	6
8	0	12
9	6	12
10	9	18
Mean	5.5 hours	11.9 hours

Table 2

Changes in Knowledge, Confidence, and Anxiety Levels

N=10

Student	Changes in Level of Knowledge	Confidence	Anxiety
1	+	=	-
2	=	=	-
3	+	+	-
4	+	=	-
5	+	+	-
6	+	+	-
7	+	=	+
8	+	+	-
9	+	+	+
10	+	+	=

Note. + indicates increase, - indicates decrease, and = indicates no change.

Discussion

One of the goals for this practicum was to enable students to increase their knowledge level about computers. When analyzing the results shown in Table 1 and Table 2, the standard of achievement for this goal and for the first two

projected outcomes was successfully met. When providing necessary basic information about computers, the writer utilized suggestions given by Harrington (1988). Students were given information in two ways, lecture/demonstration and hands-on experiences. In addition, as suggested by Harrington, the students were given sufficient time to become comfortable with the computer before the writer expected substantial results. Using suggestions from Bilderback (1992) and Marcoulides (1988), the writer proceeded through the implementation in a step-by-step manner, giving individualized attention to the students. These strategies could account for successfully achieving the first goal and the first and second outcomes.

The student who indicated no increase in her knowledge level was one who had trouble comprehending and following directions and who tended to underrate her abilities; therefore, she would be inclined to rate herself as not having increased her knowledge level. Observations made by the writer, however, indicated that this student did gain knowledge during the implementation.

Another goal for the practicum was for the students to become more comfortable (less anxious) with using computers. The results in Table 2 show that the standard of achievement for this goal and for the third outcome were met. One possible explanation for successfully meeting this goal and outcome was that the writer included the practicum

implementation as part of the coursework in General Curriculum and General Methods. Lambert and Lenthall (1989) suggested that increasing computer experience through coursework can lessen computer anxiety. In addition, the writer utilized numerous other suggestions found in the literature including (a) providing positive role models (Gelder, 1985; Weil et al., 1990); (b) providing a nonevaluative, nonacademic environment with plenty of "free play" (Gressard & Loyd, 1986); beginning with simple applications (Leso & Peck, 1992); using a personalized touch (Bilderback, 1992); and allowing the students to have input in the process (Torkzadeh & Angulo, 1992). The success of this third outcome could be a direct result of using these anxiety-lessening suggestions from the literature.

The two students who showed an increase in anxiety level had previous experience with computers. Both students indicated to the writer that they felt more stressful because they were required to use the Macintosh. Before the implementation, one had used Apple IIe and one had used IBM. The student who had previous experience on the Apple IIe also felt stress when learning how to use the IBM. Feeling stress, regardless of prior computer experience, concurs with Marcoulides' (1988) findings. Although their anxiety level increased, both students expressed positive feelings about learning to operate the different computers.

The final goal for the practicum was for students to show an increase in the usage of computers for completing assignments. Toward the end of the quarter, students chose to use word processing to prepare written assignments. These assignments included journal article critiques, research papers, and 5-day units of lesson plans. Since the lesson plans required using more sophisticated computer functions, those students who chose to use the computer to prepare the teaching unit showed remarkable courage. These students spent extra hours in the technology lab in order to complete these tasks. Table 1 depicts the substantive increase in the number of hours per week these students utilized computers. Their willingness to put in extra lab hours may account for the success of the fourth outcome.

The writer was able to achieve all of the goals and projected outcomes for the practicum during the implementation phase. Although computer anxiety affects 25% to 55% of all college students and business people (Rosen & Weil, 1990), the implementation of this practicum reduced the level of anxiety in 70% of the college students who participated in this project.

Recommendations

1. Those who are reluctant to use computers are often this way because of anxiety related to using technology of any kind. Games are a way of decreasing this anxiety and of building confidence in the students, thereby giving them the

motivation to expand their experiences with the computer. It is essential for a variety of games to be available for student use. Although the students enjoyed the games which were accessible to them, it would be advantageous to have more choices and to have these installed on the hard drive instead of on diskettes.

2. Including the computer experiences in the writer's coursework made it simple to implement the practicum; however, the 2-hour block of time each week (1 hour from each class) resulted in the writer's giving cursory attention to some of the class concepts. Since the advantages of the project far outweigh the disadvantages, one should consider restructuring the course(s) or establishing the project as a separate offering.

3. A schedule of weekly activities keeps students on track and moves them from simple to more complex tasks. Having this detailed schedule showing portfolio requirements also enables students to be aware, at all times, of the tasks that need to be accomplished. This schedule should not be restrictive, however. More experienced, computer-literate students should be able to move at a faster pace and to explore applications beyond those prescribed or to act as a peer tutor for those who are less experienced.

The writer will continue to encourage students to use the computer and will continue to employ the practices used during the implementation with students who display anxiety

when using them. However, due to the multifarious nature of the content of General Curriculum and General Methods and the need for students to show mastery on many of the concepts, the writer will not include the implementation plan in the coursework.

Dissemination

The writer has shared progress in the practicum implementation with some of her colleagues and with other students. In addition, a copy of this practicum will be shared with the division chairperson. Because of the interest shown by some of the writer's colleagues, the practicum and its implications for preservice teachers will be discussed with the entire education faculty. Hopefully, it will influence the faculty to approve a 2-hour technology course designed for education majors, using techniques utilized during the practicum implementation.

Further plans for dissemination include sharing the results with Nova cluster members and using this practicum as a basis for presenting at a professional conference. She will share the results with other educators upon request.

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APPENDIX A

CHECKLIST OF COMPUTER KNOWLEDGE AND SKILLS

CHECKLIST OF COMPUTER KNOWLEDGE AND SKILLS

Student:_____

Class:_____

Key: + = mastered; - = not mastered

BASIC COMPUTER KNOWLEDGE

Knows Names of Components	Knows 4 Operations	Knows Basic Vocabulary

BASIC COMPUTER SKILLS

Turns On/Off	Boots Program	Uses Menu	Retrieves/Saves Files

APPENDIX B

LOG OF COMPUTER USE

LOG OF COMPUTER USE

Student:_____

Class:_____

DATE	TIME IN	TIME OUT	TOTAL TIME	VERIFIED BY

APPENDIX C

STUDENT QUESTIONNAIRE

Student Survey on Computer Usage

Gender: ____Male ____Female

Age: ____ 18-21 ____ 22-30 ____ 31-40
____ 41-50 ____ Over 50

Ethnicity: ____African-American
____Anglo-American
____Asian
____Hispanic
____Native American
____Other

Which of the following computers have you used? ___Apple ___Macintosh ___ IBM /PC
___IBM Compatible ___Commodore

How much experience have you had with the following types of computer applications? Circle one letter for each application. **N = none; L = limited; M = moderate; E = extensive**

Library Uses	N	L	M	E
Bank ATM	N	L	M	E
Video games	N	L	M	E
Job-related applications	N	L	M	E
Word processing	N	L	M	E
Spreadsheet	N	L	M	E
Database	N	L	M	E
Programming	N	L	M	E

Under which of the following circumstances have you used word processing, spreadsheet, or database applications? ____Classwork ____Homework ____Job-related
____ Required ____Voluntary

Please rate the following:
I would rate my **current knowledge** of computers as
_____very limited _____below average _____average _____above average _____extensive

When using a computer, my **confidence level** is
_____extremely low _____low _____moderate _____high _____extremely high

When using a computer, my **anxiety level** is
_____extremely low _____low _____moderate _____high _____extremely high

Please check all of the reactions you have when you think about using, or actually use, a computer.

_____ Confusion
_____ Nervousness
_____ Panic
_____ Fear of losing control
_____ Inability to concentrate
_____ I have none of the above symptoms
_____ Shortness of breath
_____ Faintness
_____ Heart Palpitations
_____ Queasiness
_____ Other

Please circle one choice for each of the following statements.
SD = strongly disagree; D = disagree; U = undecided; A = agree; SA = strongly agree

The computer is a wonderful invention.	SD	D	U	A	SA
Computers make life much easier.	SD	D	U	A	SA
Computers have unlimited application possibilities.	SD	D	U	A	SA
Every teacher should know how to use computers.	SD	D	U	A	SA
Computers are fast and efficient at information processing.	SD	D	U	A	SA
I am comfortable when using a computer.	SD	D	U	A	SA
A computer is as easy to use as a typewriter.	SD	D	U	A	SA
I am confident that I can learn to use computers in an efficient, effective manner.	SD	D	U	A	SA
I look forward to learning new applications for the computer.	SD	D	U	A	SA
I enjoy using the computer.	SD	D	U	A	SA

Please check all of the following statements that apply to you.

_____I feel that others know what they are doing on the computer and I do not.
_____I'm afraid that I'll break the computer.
_____I'm afraid of losing data and not being able to find it.
_____I feel that I don't know enough about computers to operate one.
_____I feel stupid when trying to use a computer.
_____I feel that computers are cold and impersonal.

Do you own a computer? _____Yes _____No

How often do you use it? _____Never _____Seldom _____Often
_____Approximate Hours Per Week

If you were allowed to improve your computer skills, which of them would you want to improve?

_____
_____
_____
_____
_____

THANK YOU FOR YOUR COOPERATION!!

This survey adapted from Harrison & Rainer, 1992; Rosen, Sears, & Weil, 1989; Torkzadeh & Angulo, 1992; and Weil, Rosen, & Shaw, 1988.